

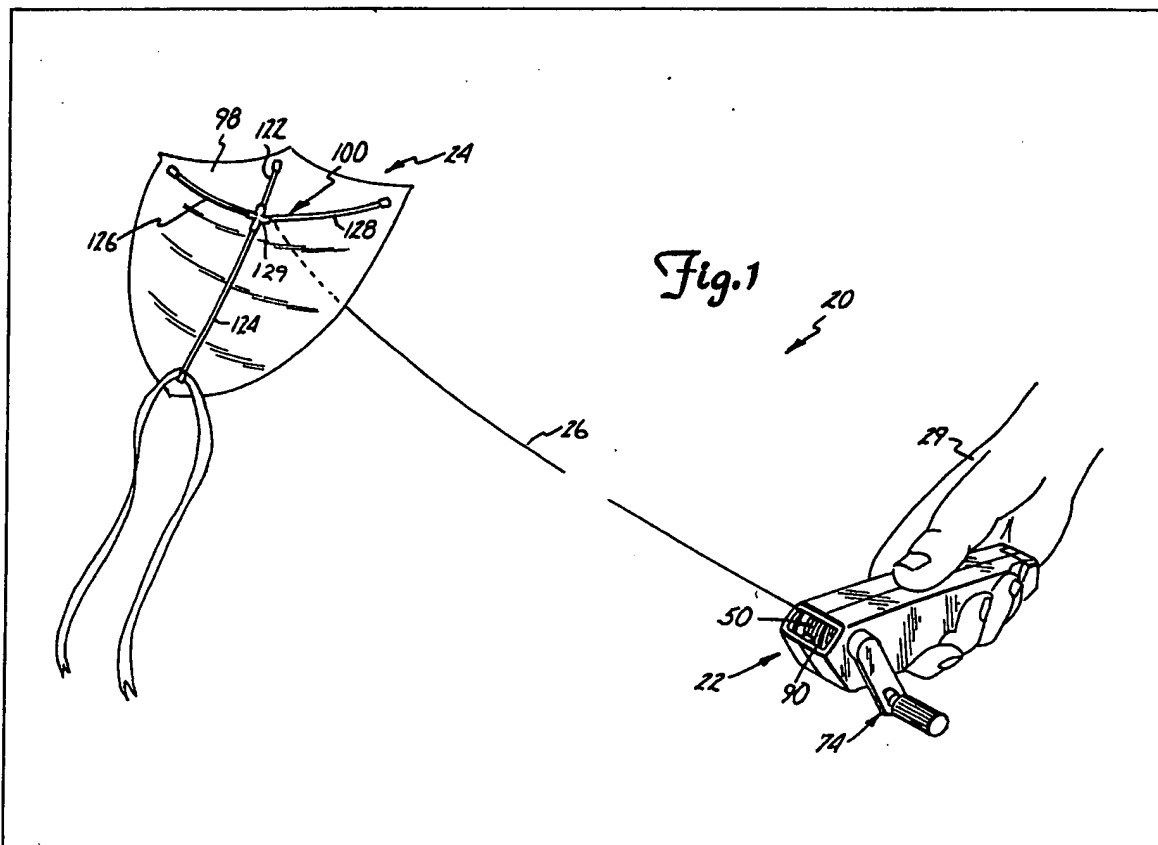
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(54) Kite apparatus

(57) An apparatus for both controlling a kite when not in use, includes a housing (22) having a storage compartment 38 and a kite (24) which can be collapsed 98, 100 so as to be compactly stored in the compartment. A reel (50) which is rotatable in the housing carries the kite line 26. The struts of the kite framework may fold (Figures 14, 15) or the kite may be inflatable (Figures 12, 13). The reel has a winding handle (Figures 5-8).



This print takes account of replacement documents later filed to enable the application to comply with the formal requirements of the Patents Rules 1982.

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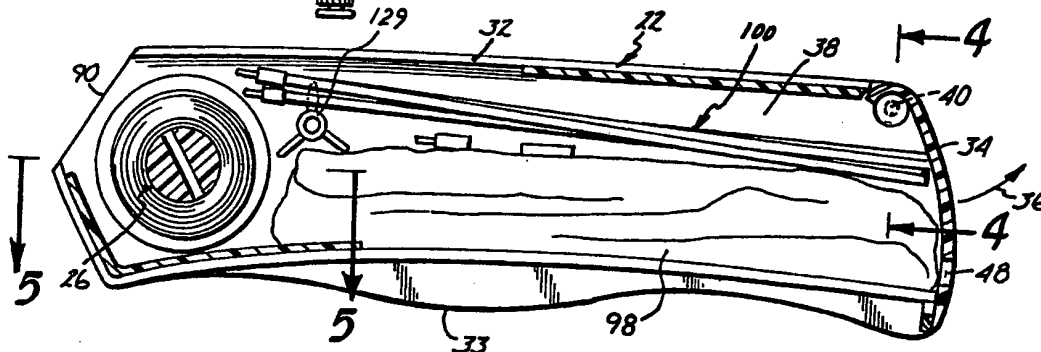
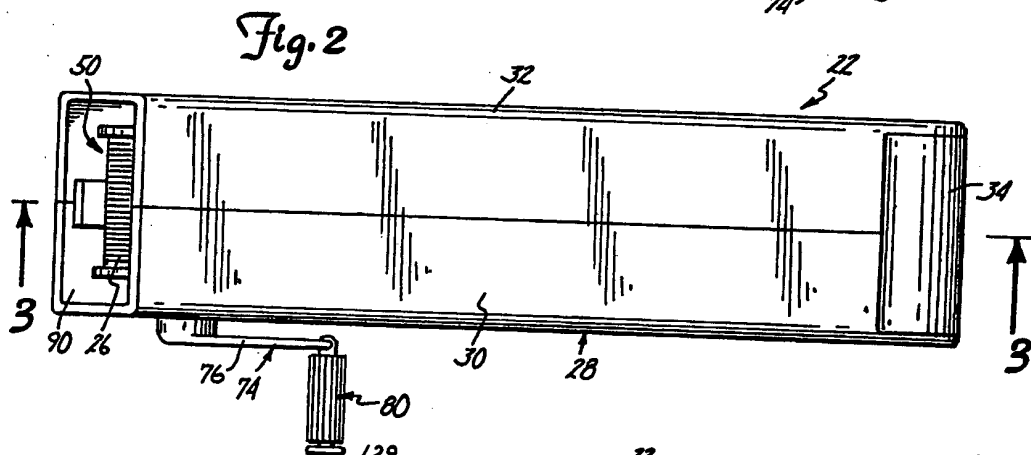
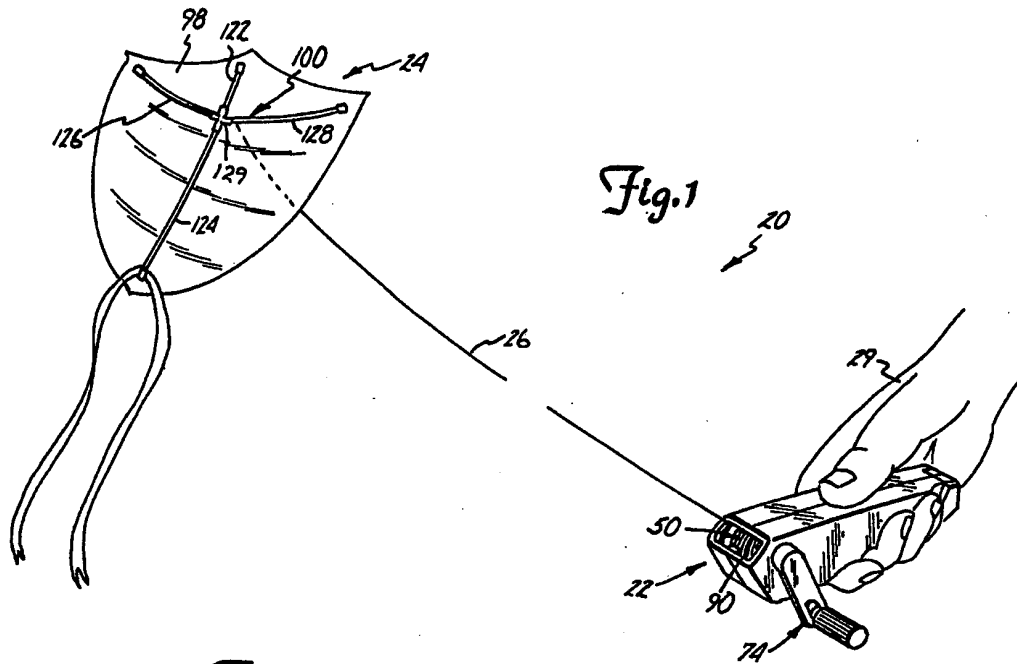


Fig. 4

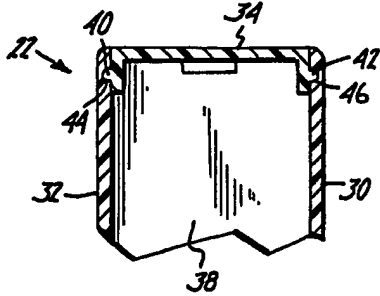


Fig. 6

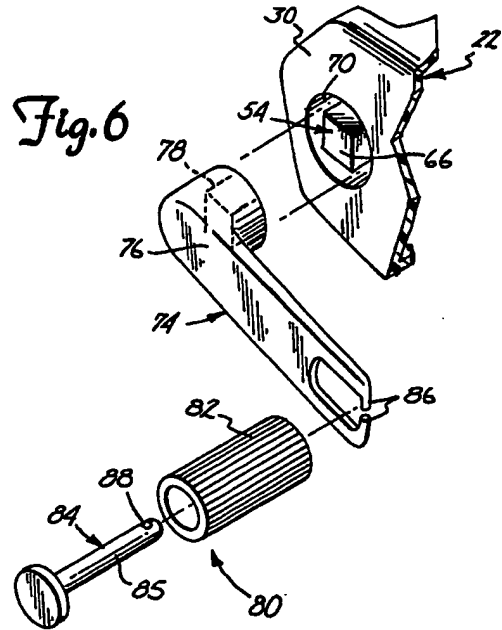


Fig. 9

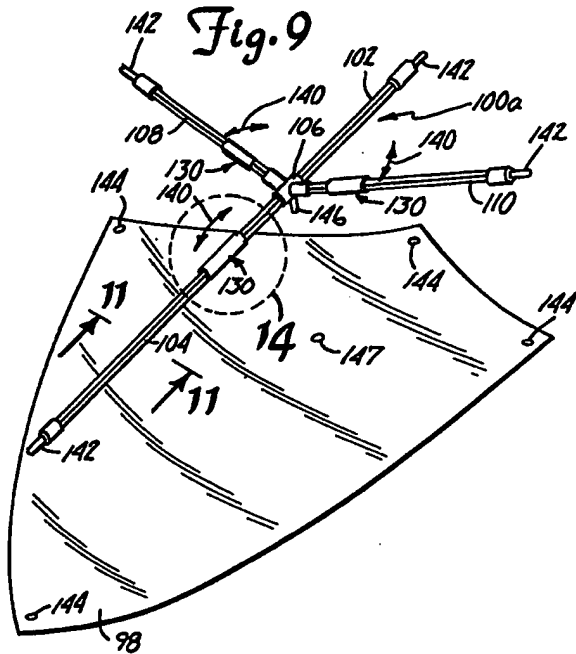


Fig. 15

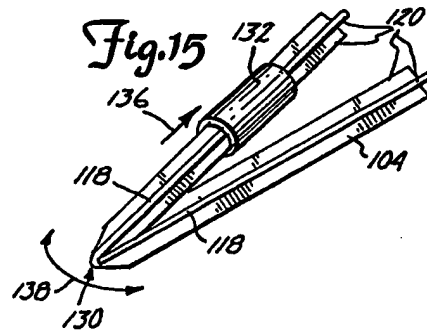


Fig. 14

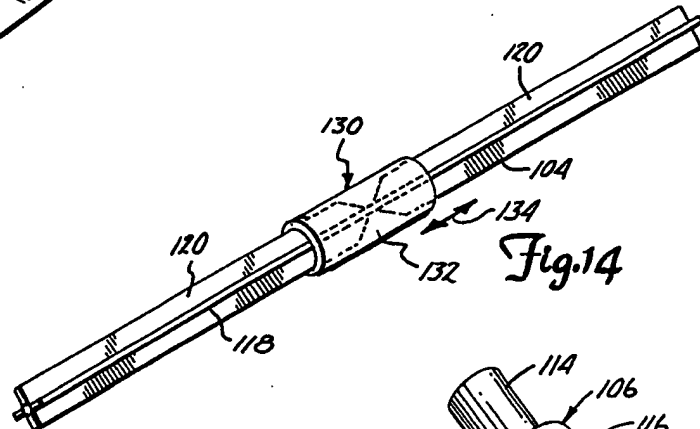
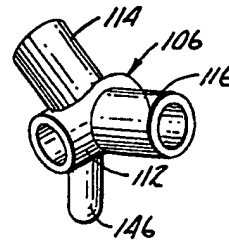
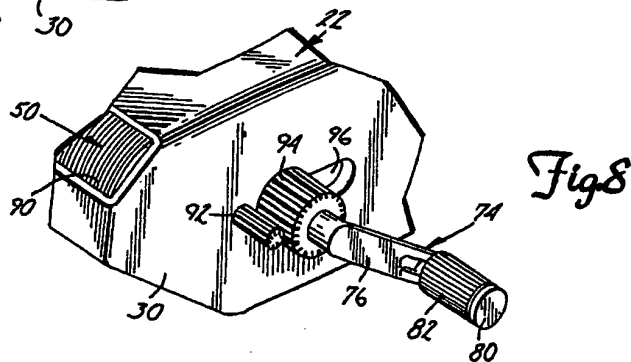
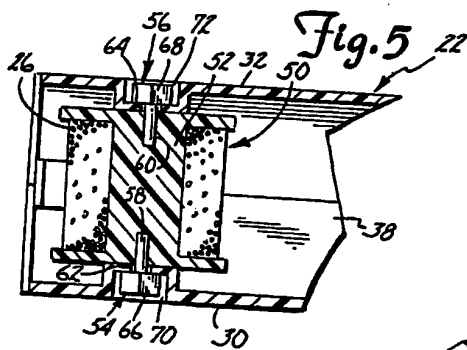
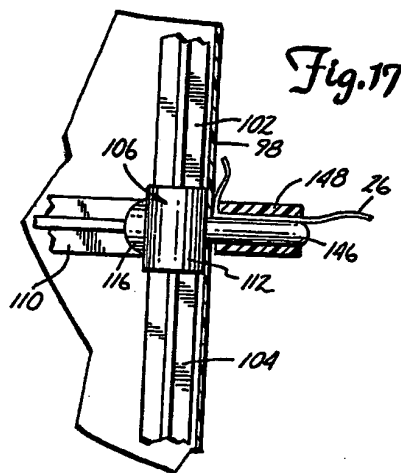
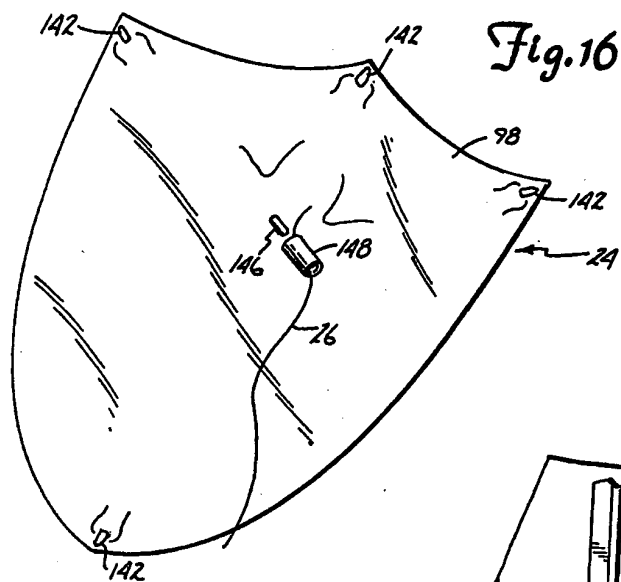
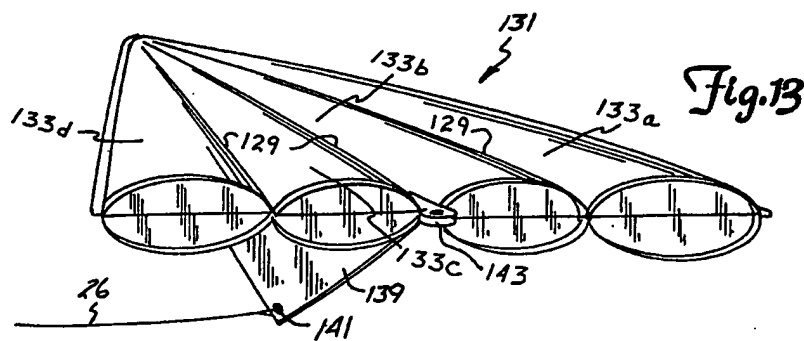
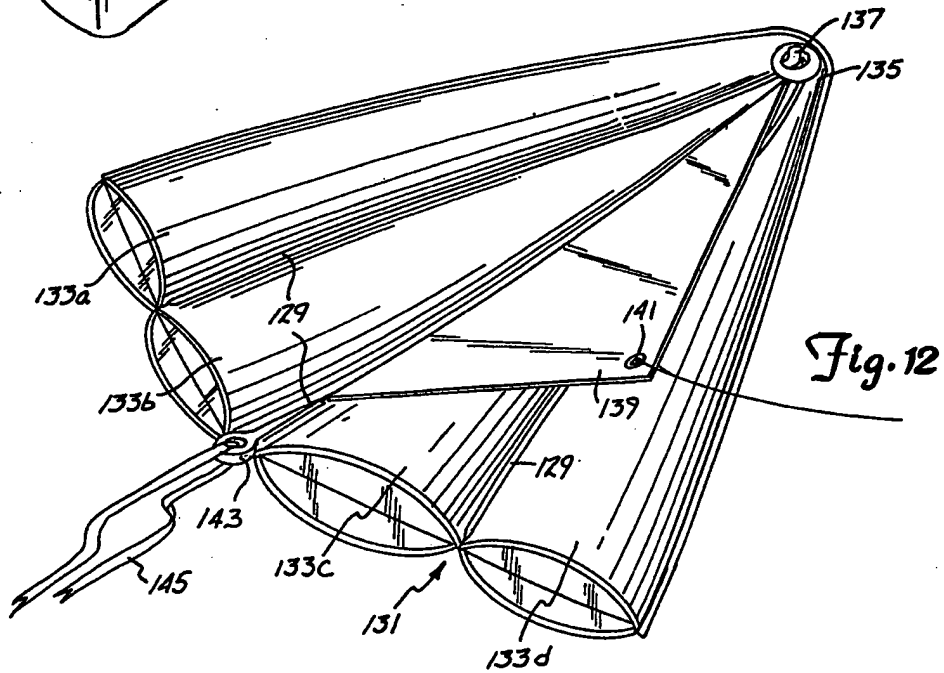
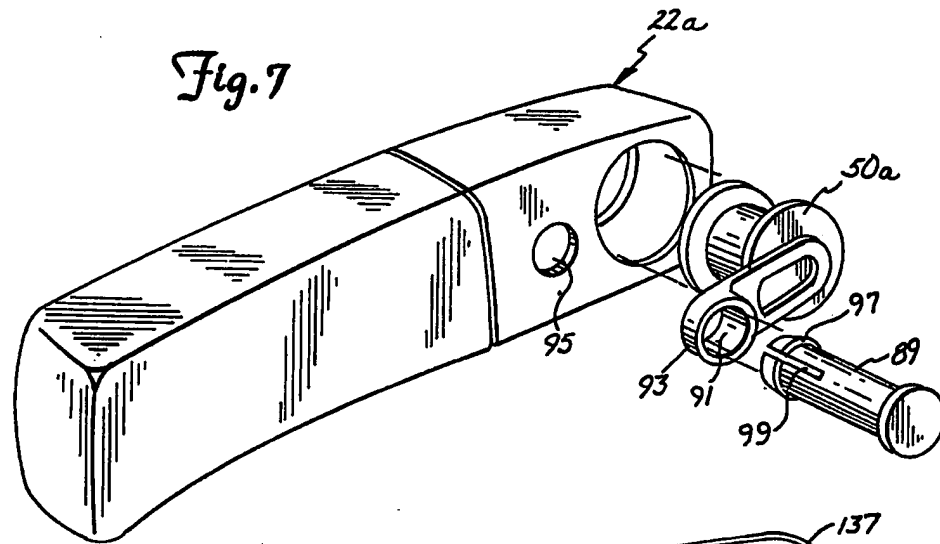


Fig. 10







SPECIFICATION

Kite apparatus

- 5 The present invention relates to apparatus for controlling the flying of a kite and for compactly storing the kite when the kite is not in use.

According to the invention kite apparatus comprises a collapsible kite and a housing having a storage

- 10 compartment for storing the kite when collapsed. Preferably a reel adapted for dispensing and storing the kite line is attached to the housing. There may be a handle for operating the reel such that kite line is removable from the reel during the flying of

15 the kite and is windable back on the reel in a smooth manner.

The collapsible construction in combination with the housing for storing the collapsed kite avoids many of the inconveniences of using a ball of line.

- 20 According to a second aspect of the invention, a foldable kite frame comprises a plurality of kite frame members, each of the kite frame members except one having a bendable section; means capable of providing rigid longitudinal support to the

25 bendable section of each frame member, and of being removable from providing rigid longitudinal support when desired; and connective means for rigidity connecting each of the frame members to each other.

30

Brief description of the drawings

Figure 1 is a perspective view of the kite apparatus for controlling and storing a kite;

Figure 2 is a top plan view of the control and storage mechanism of the present invention;

Figure 3 is a cross sectional view of the interior of the storage and control mechanism taken along the line 3-3 in *Figure 2*;

Figure 4 is a fragmentary cross sectional view of the top rear portion of the control and storage mechanism taken along the line 4-4 in *Figure 3*;

Figure 5 is a fragmentary cross sectional view of a forward portion of the storage and control mechanism taken along the line 5-5 in *Figure 3*;

45 *Figure 6* is an exploded fragmentary perspective view of a handle used to operate a reel in the control and storage mechanism;

Figure 7 is a fragmentary perspective view of an alternative embodiment of a handle used to operate

50 a reel;

Figure 8 is a fragmentary perspective view of an alternative embodiment of the control and storage mechanism including gears which facilitate quick rewinding of the kite line;

55 *Figure 9* is an exploded perspective view of a preferred embodiment of a kite used with the control and storage mechanism of the present invention;

Figure 10 is a perspective view of a union that holds the kite frame together;

60 *Figure 11* is a cross sectional view of a frame member of the kite frame taken along line 11-11 in *Figure 9*;

Figure 12 is a perspective view of an inflatable kite;

65 *Figure 13* is a perspective view of an inflatable kite

of *Figure 12* taken at a different angle;

Figure 14 is a perspective view of a frame member having a bendable section, the view being taken within the broken circle 14 in *Figure 9*;

70 *Figure 15* is a perspective view of the frame member shown in *Figure 14* in a bent position;

Figure 16 is a perspective view of a preferred manner of attaching the kite line to the kite using a connective sleeve; and

75 *Figure 17* is a fragmentary cross sectional view of the kite string attached to the union through the use of the connective sleeve.

Detailed description of the preferred embodiments

- 80 The apparatus for controlling and storing a kite of the present invention is generally indicated at 20 in *Figure 1*. Throughout the Figures like reference characters will be used to indicate like elements. The apparatus 20 includes a control and storage mechanism, generally indicated at 22, and a collapsible kite 24. A kite line 26 connects the mechanism 22 with the kite 24 and is used for flying and controlling the kite.

The control and storage mechanism 22 is further illustrated in *Figures 2-6*. The mechanism 22 includes a housing 28 that is preferably elongated in shape and of a small size that is easily held within a hand 29, as illustrated in *Figure 1*. The housing 28 is made of left and right housing halves 30, 32, respectively, as shown in *Figure 2*. The left and right housing halves 30, 32 are preferably made of plastic and are attached to each other by suitable cooperating snaps that are an integral part of the left and right housing halves 30, 32. Each housing half has a lower

100 contoured edge 33, as illustrated in *Figure 3*, contoured in the shape of a "grip" to facilitate holding the housing in a hand 29, as illustrated in *Figure 1*.

As illustrated in *Figure 3*, a door 34 defines part of the rearward portion of the housing 22. The door 34 opens in a direction of arrow 36 to expose a compartment 38 that is defined by interior surfaces of the housing 22. The compartment 38 is used to store the various components of the kite 24. As illustrated in *Figure 4*, the door 34 pivots about a pair of projections 40, 42 which extend outwardly into cooperating indentations 44, 46 in right and left housing halves 32, 30, respectively.

The door 34 is also usable as a weight for helping to fly the kite in certain conditions. The door 34 has an opening 48 in a lower portion thereof, illustrated in *Figure 3*. To use the door as a weight, such as in the tail end of the kite 24, the door is simply removed from the housing 22 by a twisting action that disengages either the projection 40 or the projection 42 from the respective cooperating indentation 44 or 46. After the door 34 is removed, the door is attached to the tail end of the kite by inserting a string or the like through opening 48 and then tying the door to the kite proximate the tail end.

125 As shown in *Figures 2 and 5*, a reel 50 is preferably positioned within the housing 28 at a forward end thereof. The reel 50 includes a kite line spool 52 having kite line 26 wound thereon and rotatably attached within the housing 22 by pins 54 and 56. The pins 54 and 56 have shaft portions 58, 60 that

project through suitable openings 62, 64 in respective housing halves 30, 32. The shaft portions 58, 60 extend into and frictionally engage the spool 52. The openings 62 and 64 in the housing halves are of a greater diameter than the diameter of the shaft portions 58 and 60, allowing the pins 54, 56 and the spool 52 to rotate with respect to the housing 28. The openings are recessed within the housing 28.

The pins 54, 56 preferably have heads 66, 68, respectively, each head having a substantially square configuration and positioned within recesses 70, 72 in respective housing halves 30, 32. As illustrated in Figure 6, a crank handle 74 is attachable to the head 66 of the pin 54 proximate housing half 30. Similarly, the handle 74 may be attachable to the head 68 of the pin 56 proximate housing half 32. The handle 74 includes a crank arm member 76 with a head engaging recess 78 similar in size and configuration to head 66 for frictionally engaging the head 66. A knob, generally indicated at 80, is attached to the arm 76 on an end opposite from the recess 78. The knob 80 includes a crank spool 82 attached to the arm 74 by a pin 84 whose shank portion 85 extends through the spool 82. The pin 84 is attached to the arm 76 at a distal end by prongs 86 extending into an aperture 88 located in the distal end of the shank portion 85. It will be appreciated that when the knob 80 is grasped to turn the arm 76, the spool 82 will rotate freely about the shank portion of the pin 84, facilitating the turning of the crank handle 74 and the kite line spool 52. The crank handle 74 when detached from the pin 54 is stored within the compartment 38.

In an alternative embodiment of the control and storage mechanism generally illustrated at 22a in Figure 7, a crank spool 89 is slidable through an opening 91 in an arm member 93 in a direction substantially perpendicular to the plane of the arm member 91. A crank spool receiving aperture 95 for receiving an end of the crank spool 89 is positioned within the control and storage mechanism. Positioning the end of the crank spool 89 within the spool receiving aperture 95 provides a stop that prevents reel 50a from winding or unwinding the kite line. Normally, the spool 89 is in the innermost position in which the crank and the outer end of spool 89 are closely adjacent the housing 22a. The spool 89 is pulled out whenever it is desired to wind or unwind the line, the spool being used as a handle. The inner end of spool 89 is provided with a flange 97 which prevents the removal of the handle as in the other modification. The inner end of spool 89 is split as shown at 99 to allow the two portions to be sprung together to permit the insertion of flange 97 into the opening 95.

As shown in Figures 2 and 3, the housing 22 has an opening 90 through which the kite line 26 is let out from the reel 50 to fly the kite and is reeled in to retrieve the kite. The opening 90 preferably extends across the width of the spool 52.

In an alternative embodiment, illustrated in Figure 8, a pair of gears is included for facilitating quicker retrieval of line 26 and the kite 24. A first gear 92 is fixedly attached to the reel 50 in a suitable manner such that the gear 92 drives the reel 50. A second

gear 94, larger in diameter than the first gear 92, is fixedly attached to the handle 74 which is rotatably attached to the housing 22 within a slot 96 by any suitable means which holds it against withdrawal from the housing. As is easily understood by those skilled in the art, one turn of the handle 74 will cause multiple turns of the gear 92 and facilitate quicker retrieval of the line 26 and the kite 24. To dispense line out, the gear 94 is disengaged from the gear 92 by sliding the handle 74 along the slot 96. The reel is then completely disengaged from the handle 74 and can rotate freely.

The kite 24, as illustrated in Figure 1, includes a flexible kite sail material 98 for receiving the force of the wind and providing a motive force to the kite. The kite material 98 is stretched over a sufficiently rigid kite frame 100. The kite frame 100 is sufficiently rigid to hold the kite material 98 in a stretched-out manner but is also sufficiently yieldable to allow easy attachment of the kite material 98 to the frame 100. Preferably, the kite of the present invention is relatively small in size, 1/4 the size of an average size kite. Preferably, the kite is approximately 8 to 9 inches in length and 10 to 12 inches wide.

The elements of the kite frame are more fully illustrated in Figure 9.

The kite frame 100a includes a forward frame member 102 in coaxial alignment with a keel frame member 104, both frame members 102 and 104 being connected in coaxial alignment with each other by a union 106. The union 106 also rigidly connects a left wing frame member 108 and a right wing frame member 110 to each other and in a substantially transverse relationship to the frame members 102 and 104. The union 106, as more fully illustrated in Figure 10, has a main hollow body portion 112 which frictionally holds the frame members 102 and 104. A pair of integral left and right legs 114 and 116 are transversely positioned to the body portion 112 and are inclined with respect to each other. The left and right legs 114 and 116 have apertures for frictionally engaging the left and right frame members 108 and 110, respectively. The kite frame 100 in Figure 1 is similarly constructed as kite frame 100a.

Each of the frame members 102, 104, 108 and 110, as shown in Figure 9, is formed of a central shaft member 118 with four outwardly extending ribs 120 spaced substantially equal distances from each other and integral with the shaft member 118, as illustrated in Figure 11. The ribs 120 provide a beam strength to the frame members along their longitudinal axis and frictionally engage the union 106 with their outer surfaces.

The kite frames 100 and 100a are collapsible kite frames so that the frames and the sail material can be compactly stored within the compartment 38. As illustrated in Figure 1, the kite frame 100 includes a forward frame member 122, a keel frame member 124, left wing frame member 126, and right wing frame member 128, each frame member being made of a suitable tubular plastic material and frictionally engaging a suitable central union 129. When the user is no longer flying the kite 24, the kite sail material 98 is detached from the frame 100 and each

of the frame members 122, 124, 126 and 128 is detached from the central union 129 and placed within the housing 22.

In the embodiment 100a, illustrated in Figure 9, the frame members 102, 104, 108 and 110 do not have to be detached from the union 106. The keel frame member 104, the left wing frame member 108 and the right wing frame member 110, each have a bendable portion 130 as best shown in Figures 14 and 15. Proximate the bendable portion 130, the ribs 120 taper to a common point of convergence of the shaft member 118, with the shaft member 118 acting as a hinge at the common point of convergence for each of the frame members 104, 108 and 110. The frame members 104, 108 and 110 are preferably made of a material, such as polypropylene, which has a hinging characteristic allowing the shaft member to bend.

To cause the bendable portion to be rigid, for purposes of assembling the kite frame, a sleeve 132 circumferentially engages the frame members and is slidable in the direction of arrow 134. The sleeve 132 provides sufficient rigidity to the bendable portion 130 when slide thereover. To store the kite, the sleeve 132 is slid in the direction of arrow 136, as illustrated in Figure 15, and the frame member 104 is bent in the direction of arrow 138. As a result, the kite frame 100a is collapsed without detaching the frame members from the union and thereby further ensuring that the various components of the frame 100a are not lost during storage.

As illustrated in Figure 9, the bendable portion 130 is positioned along each of the appropriate frame members such that when the frame members are bent in the general direction of arrows 140, the bent frame members have their distal ends positioned proximate the distal end of the frame member 102 which is not bent. Although the frame 100a has been immediately described with particular detail as to bendable portion 130, it will be understood by those skilled in the art that the appropriate frame members may be bendable by other means, not disclosed herein, and made rigid in another manner other than the sleeve 132 and still be within the spirit and scope of the present invention. For example, the keel frame member and the left and right wing frame members may be made of a bendable plastic tubing.

To assemble the kite 24, each of the frame members of the kite frames 100 and 100a preferably have a projection 142 disposed at their distal ends. The kite sail material 98 is fastened to the kite frames 100 and 100a by extending the projections 142 in properly positioned apertures 144 in the kite sail material 98.

The kite line 26 and the kite 24 are attached to each other by placing a stud 146 of the union 106 through an aperture 147 in the kite sail material 98. The stud 146 projects through the kite sail material 98, as illustrated in Figures 16 and 17, and frictionally engages a kite string connector sleeve 148. The kite line 26 is positioned within the connector sleeve 148 and is squeezed between any interior surface of the connector sleeve 148 and the stud 146 securely connecting the kite line 26 to the kite 24.

To fly the kite 24, the line 26 may either be pulled

out from the reel 50 by hand or the handle 74 may be turned in a direction that will unwind the line 26 from the reel 50. The kite is easily controlled by holding the housing 22 in one hand, as illustrated in Figure 1.

To retrieve the kite 24, the handle 74 is simply turned in a direction that will wind the line 26 onto the reel 50. After the kite 24 has been retrieved, the connector sleeve 148 is disengaged from the prong of the union 106 to disengage the kite line 26 from the kite 24.

To store the kite 24 for future use, the kite sail material 98 is removed from the kite frame 100 and folded and placed within the storage compartment 38 of the housing 22, as illustrated in Figure 3. The kite frame is also collapsed by either disassembling or bending the appropriate frame members, depending on which embodiment of a kite frame is used. The frame 100 along the central union 129 is also placed within the housing 22 for future use. In addition, the handle 74 can be detached from the head 66 of the pin 54 and stored within the compartment 38.

Alternatively, an inflatable kite, generally indicated at 131 in Figures 12 and 13, is used with the apparatus of the present invention. The kite 131 has four longitudinal pouches 133a-d, each pouch substantially separated from the other pouches by a seam 129. The kite is made of a flexible thermoplastic material and each seam 129 is formed by a suitable heat sealing process. The four pouches 133a-d are inflatably connected at a forward end 135 of the kite 131, and each pouch has a closed rear end and tapers to the forward end forming a V-shaped kite. A suitable valve 137 allows the user to inflate the kite 131 with air or another suitable gas and stops the air from escaping from the kite once the kite is inflated. A center flap 139 is fixedly attached to an underside of the seam 129 that separates pouches 133b and 133c and extends generally downwardly therefrom. A kite string grommet 141 with an aperture is located on a lower end of center flap 139. The grommet 141 is used to attach the kite string 26 to the kite 131 by passing the string 26 through the grommet and tying the string with a suitable knot. A kite tail grommet 143 with an aperture is located at a rearward end of the kite 131 for attaching a kite tail 145 to the kite 131.

Although the inflatable kite 131 has been described with particular detail, all suitable configurations of inflatable kites are included within the present invention. Some examples of inflatable kites are disclosed in the following patents and are herein incorporated by reference: Sparkman Patent No. 2,769,605; Pohl Patent No. 3,003,722; Neal Patent No. 3,335,985; Laske Patent No. 3,952,975; and Laske Patent No. 3,980,260. Another suitable inflatable kite is manufactured by Gayla Industries, Inc. of Houston, Texas. An important element of the inflatable kite is that the kite is deflatable to a size capable of storage within the housing 22.

The kite apparatus, as disclosed herein, has several advantages:

1. The various components of the kite can be stored in the compartment of the housing and not be either lost or damaged.

2. The housing and compartment offer a ready storage space for the kite, eliminating the inconvenience of trying to find a proper place to store the kite without losing the components or having the kite damaged during storage.

3. The kite can be flown by simply holding the housing 22 in one hand, in contrast to trying to balance a ball of kite line in one hand while dispensing line with the other.

4. The kite line is stored on the reel in a neat and organized manner unlike rewinding kite line in a ball.

5. The kite line, being stored on a reel attached to the same housing that stores the disassembled kite, will not become separated from the kite during storage minimizing the chances of the line becoming lost or used for purposes other than flying the kite. Consequently, a new line will not have to be purchased to fly the kite the next time.

Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the present invention.

25 CLAIMS

1. Kite apparatus comprising a collapsible kite, a kite line having a first end attached to the collapsible kite; and a housing having an interior compartment for storing the kite in a collapsed state, and means for storing the kite line with the second end of the kite line being attached to the storing means.

2. Apparatus as claimed in Claim 1 wherein the kite includes flexible sail material and a collapsible frame.

3. Apparatus as claimed in Claim 2 wherein the collapsible frame includes a plurality of frame members and a union having means for rigidly and detachably connecting the frame members to each other.

4. Apparatus as claimed in Claim 3 wherein each frame member except one, has a bendable section, with each of the frame members with the bendable section being bendable along the longitudinal axis of the frame member without a bendable section.

5. Apparatus as claimed in Claim 4 and further including a sleeve circumferentially surrounding each frame member with a bendable section and coaxially slidable along the frame members over the bendable sections to supply rigid support thereto.

6. Apparatus as claimed in any of Claims 3-5 wherein each of the frame members comprises a longitudinal shaft portion and a plurality of outwardly extending ribs integral with the shaft portion.

7. Apparatus as claimed in Claim 8 and Claim 10 wherein the bendable section is formed by having the ribs taper to a common point on the shaft portion.

8. Apparatus as claimed in any preceding claim wherein the means for storing the kite line is a reel.

9. Apparatus as claimed in Claim 8 in which the reel is rotatably attached to interior surfaces of the housing, and in which the housing has an opening for the kite line to extend from the reel to the kite.

10. Apparatus as claimed in Claim 9 including a

handle mounted on the housing for turning the reel.

11. Apparatus as claimed in any preceding claim wherein the housing includes a door adapted to reveal the interior compartment and allow the kite to be stored within the compartment in a collapsed state, the door being securable to a closed position.

12. Apparatus as claimed in Claim 11 wherein the door can be detached from the housing.

13. Apparatus as claimed in any preceding claim wherein the kite is an inflatable kite.

14. Apparatus as claimed in Claim 12, wherein the inflatable kite includes; a plurality of inflatable gas retaining longitudinal pouches constructed from a common flexible sheet, each pouch having a rearward gas sealed end and a common gas chamber at a forward end, all of the pouches being inflatably connected at the common gas chamber; and valve means for inflating all of the pouches through the common gas chamber and for stopping escape of the gas after inflation and for permitting deflation of the kite to a collapsed state for storage within the interior compartment of the housing.

15. Apparatus as claimed in Claim 14 wherein the inflatable kite includes a flap member centrally located among the pouches and attached to the first end of the kite line.

16. Apparatus as claimed in Claim 15 wherein each pouch tapers from the rearward end to the forward end forming a V-shaped kite.

17. Kite apparatus constructed and arranged substantially as herein specifically described with reference to Figures 1-6, or as modified with reference to Figures 7,8,12 or 13 of the accompanying drawings.

18. A foldable kite frame comprising a plurality of kite frame members, each of the kite frame members except one having a bendable section; means capable of providing rigid longitudinal support to the bendable section of each frame member, and of being removable from providing rigid longitudinal support when desired; and connective means for rigidly connecting each of the frame members to each other.

19. A frame as claimed in Claim 18 wherein each of the frame members has a distal end and each of the bendable sections is positioned such that when the frame members with bendable sections are bent to lie along axes that are parallel to the axis of the frame member with no bendable section, the distal ends of the frame members are close to each other.

20. A frame as claimed in Claim 19 or Claim 20 wherein the means for providing rigid support includes a sleeve circumferentially surrounding each frame member with a bendable section and coaxially slidable along the frame members over the bendable sections.

21. A frame as claimed in any of Claims 18-20, wherein each of the frame members comprises a longitudinal shaft portion and a plurality of outwardly extending ribs integral with the shaft portion.

22. A frame as claimed in Claim 21 wherein the bendable section comprises the ribs tapering to a common point on the shaft portion.

23. A frame as claimed in any of Claims 18-22, wherein the connective means is a central union

having means for frictionally engaging each of the frame members.

24. A kite comprising a frame as claimed in any of Claims 18-23 and a flexible kite sail positioned over the kite frame and attached to the ends of the frame members.

25. A kite frame constructed and arranged substantially as herein specifically described with reference to Figures 9, 10, 11, 14, 15 and 17 of the accompanying drawings.

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